Rebuilding our city: the role of transport

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Presentation to University of 3rd Age Avonhead
March 2nd 2015

Who am I?

- University Professor
  - Teacher and Researcher
- Local Transport involvement
  - Regional Transport Committee
- Christchurch resident for 15 years
- Commuter & utility cyclist
- Husband and father

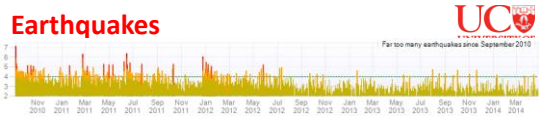
Talk today

1. Christchurch pre-earthquakes
2. Earthquakes!
3. Transport, cities and community
4. Plans for the future
5. A cycling city
6. A rail city
7. Summary

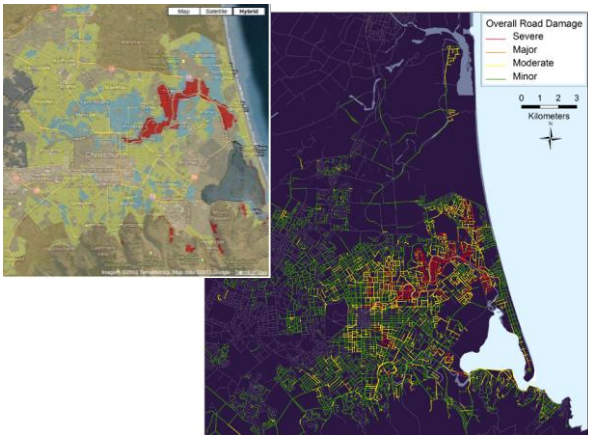
Christchurch pre-earthquake

- Struggling central city & thriving malls
- Car-centric
- Reasonable cycling rates
  - but very limited separated infrastructure
  - but limited to confident cyclists
- Growing bus use
  - High rates for NZ, but low internationally
  - Low level about rail

Earthquakes

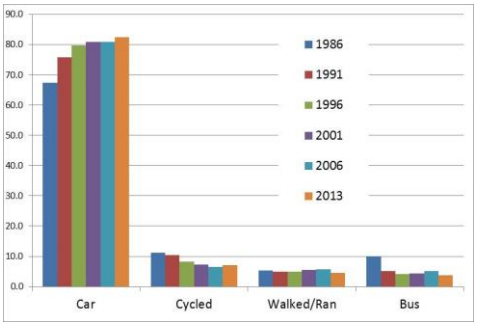


- Major earthquakes in and around Christchurch, New Zealand, since September 2010
- 70% of city centre to be demolished
- 895 kms (45%) Christchurch's roads need rebuilding

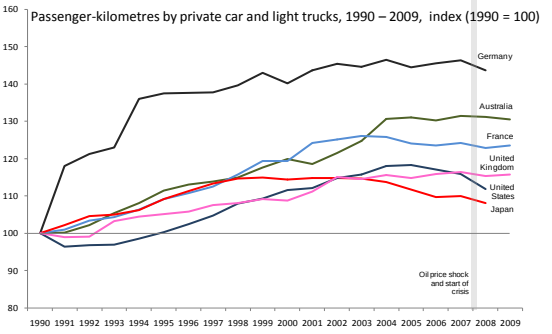


TRANSPORT, CITIES AND COMMUNITY

Transport mode (census data)



Peak car



Peak car

The New Zealand Herald

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Brian Rudman 's Opinion

Email Brian

Brian Rudman is a NZ Herald feature writer and columnist.

Brian Rudman: End of the road for the sacred car?

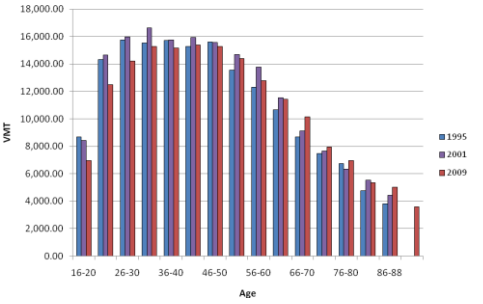
9:30 AM Friday Jun 6, 2014 — 89 comments

Auckland Region | Brian Rudman on Auckland | Motoring

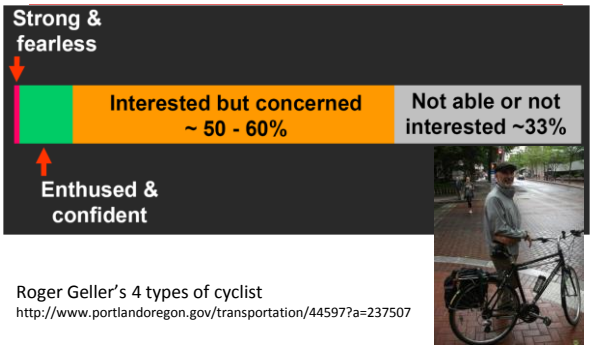
As New Zealand's largest roading project roars ahead, people are using their vehicles less and their legs more

Peak car and age

Annual vehicle miles per driver by age, USA, 1995, 2001, 2009



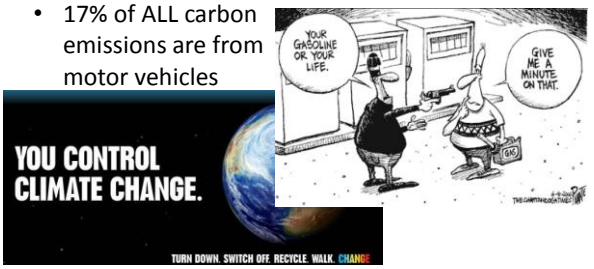
Cyling typology



Roger Geller's 4 types of cyclist
http://www.portlandoregon.gov/transportation/44597?a=237507

Climate change

- Domestic transport contributes 42 % of total carbon dioxide emissions in NZ
- 17% of ALL carbon emissions are from motor vehicles



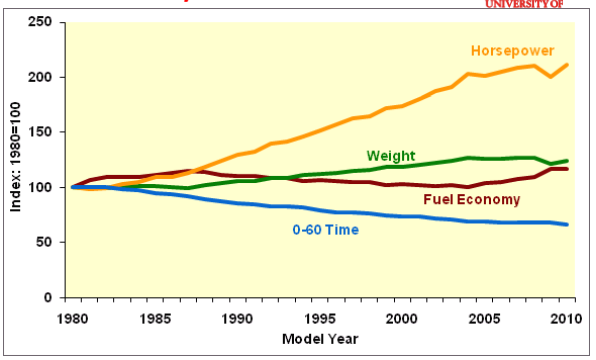
Traffic pollution

Traffic pollution:

- Kills 45 adult Cantabrians per year
- Causes 47,000 restricted activity days among Canterbury
- From PM_{10} costs $126m per year in Christchurch ($164m Canterbury)

Source: Kuschel et al, Updated Health and Air Pollution in New Zealand Study Volume 1: Summary Report, 2012, Prepared for HRC, MoT, MfE and NZTA.

Fuel efficiency



Characteristics of New Light Vehicles over Time
www1.eere.energy.gov/vehiclesandfuels/facts/m/2011_fotw690.html

Road space and congestion

Cycling Promotion Fund, Australia. wwwbikeoz.com.au/index.php/cycling-promotion-fund)

Road building

- National $12.3bn funding package (2012-15)
  - Roads especially new state highways (Roads of National Significance)
  - 0.43% for walking & cycling

"this means the funding available for public transport, cycling and walking networks … will be heavily constrained for much of the early recovery period"

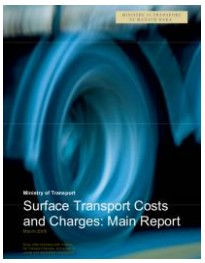
- Christchurch Transport Strategic Plan

  - National's extra $100m adds extra 0.7%!

Who pays for transport

- cars directly pay 64% of their costs
- trucks directly pay 56% of their costs
- buses directly pay 68% of their costs
- rail users directly pay 77% of their costs

Does not include exercise-related health!



Economic sense

- NZ research: *"transforming urban roads over the next 40 years, using best practice physical separation on main roads and bicycle-friendly speed reduction on local streets, would yield benefits 10–25 times greater than costs"* (Macmillan et al, 2014)

New York City Dept of Transportation, Measuring the Street: New Metrics for 21st Century Streets
www.nyc.gov/html/dot/downloads/pdf/2012-10-measuring-the-street.pdf

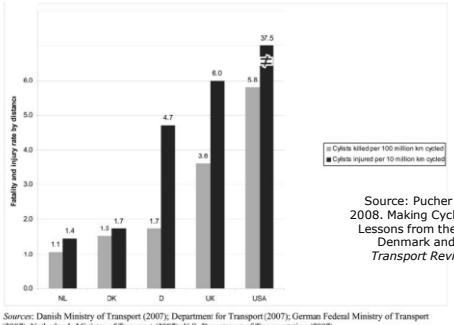
Average Customer Expenditures by Mode of Travel and Type of Establishment

Clifton K, 2012, Business Cycles: Catering to the Bicycling Market, TRB 280, 26

Mode	Establishment	Trips per Month	$ per Trip	$ per Month	N
Auto	Bar	1.6	25.55	40.21	88
	Convenience	9.9	7.98	79.37	543
	Restaurant	2.2	18.74	41.16	409
	Total	4.5	13.70	61.03	1,040
Bike	Bar	4.9	14.08	68.56	42
	Convenience	14.5	7.30	105.66	63
	Restaurant	3.5	12.08	42.52	48
	Total	7.1	10.66	75.66	153
Transit	Bar	1.8	19.54	35.35	13
	Convenience	10.9	6.91	75.62	53
	Restaurant	3.5	11.52	40.68	36
	Total	5.7	10.15	58.16	102
Walk	Bar	3.1	22.17	68.42	53
	Convenience	12.6	6.13	77.34	254
	Restaurant	2.6	16.74	43.77	131
	Total	5.9	11.25	66.22	438
Total	Bar	2.5	21.78	53.59	196
	Convenience	10.9	7.36	80.40	913
	Restaurant	2.4	17.39	41.78	624
	Total	5.0	12.60	63.46	1,733

NOTE: *N* = number of respondents.

Safety

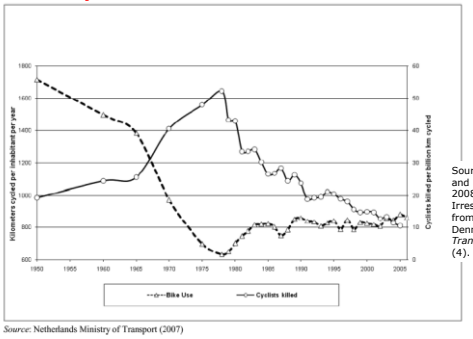


Source: Pucher and Buehler. 2008. Making Cycling Irresistible: Lessons from the Netherlands, Denmark and Germany. *Transport Reviews* 28 (4).

Sources: Danish Ministry of Transport (2007); Department for Transport (2007); German Federal Ministry of Transport (2007); Netherlands Ministry of Transport (2007); U.S. Department of Transportation (2007)

Figure 10. Fatality rates and non-fatal injury rates in the Netherlands, Denmark, Germany, the UK and the USA (2004–2005).

Safety

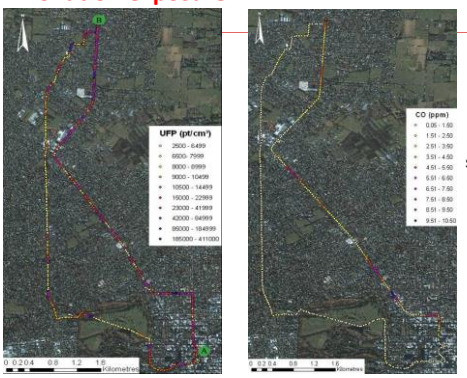


Source: Pucher, John, and Ralph Buehler. 2008. Making Cycling Irresistible: Lessons from the Netherlands, Denmark and Germany. *Transport Reviews* 28 (4).

Source: Netherlands Ministry of Transport (2007)

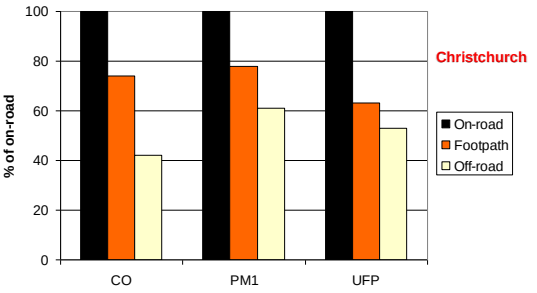
Figure 12. Inverse trends in cycling fatality rates and annual kilometres cycled per inhabitant in the Netherlands (1950–2005).

Pollution exposure



Source: Simon Kingham and Woodrow Pattinson

Pollution exposure



Source: Simon Kingham

Social capital

Communities that promote sustainable and active can:

- Reduce disparities between the rich and poor
- Promote good neighbourhood
- Enable poor to gain better access to healthy food
- Lead to decreased crime

Source: OECD, 2000, Environmentally sustainable transport. Futures, strategies and best practices.

Happier people

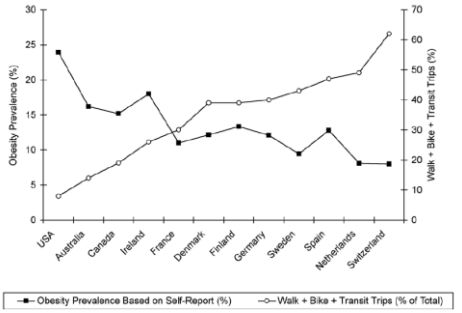
Morris EA and Guerra E, 2014, Mood and mode: does how we travel affect how we feel? Transportation DOI 10.1007/s11116-014-9521-x

Obesity

"*New Zealand is in the grip of a global obesity epidemic, the future costs of which will be enormous, potentially unaffordable for the health system.*"

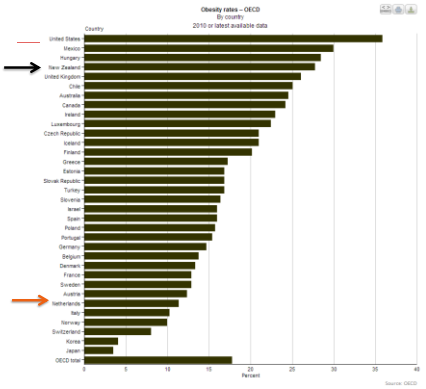
- Professor Norman Sharpe, New Zealand Heart Foundation medical director, Sept 2011 www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10752121

What level of impact



Source: Bassett et al, 2008, Walking, Cycling, and Obesity Rates in Europe, North America, and Australia. *Journal of Physical Activity & Health* 5 (6):795-814.

What level of impact



What level of impact

If Christchurch's obesity rates dropped from 33% to:

- 11.4% (Netherlands); we'd save over $50m p.a.
- 20% - we'd save over $30m p.a.
- 25% - we'd save over $20m p.a.

How?

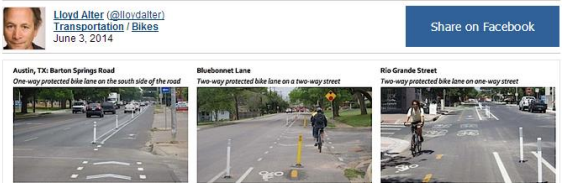
Assessment of the type of cycle infrastructure required to attract new cyclists

- Type of infrastructure needed to attract ***'new'*** cyclists
- Investigate the barriers and motivations for cycling
  - Perceived danger is main barrier!
  - Physical separation was key

Source: Kingham S, Koorey G and Taylor K, 2011, Assessment of the type of cycle infrastructure required to attract new cyclists. NZTA Research Report 449.

How?

If you build it, they will come: New study shows that bike lanes increase ridership



Monsere et al, 2014 Lessons from the Green Lanes: Evaluating Protected Bike Lanes in the US. NITC Final report NITC-RR-583, June 2014.

Other barriers

Is congestion bad?

- Congestion suppresses latent travel demand
- Congestion encourages less travel or use of alternative modes
  - Bike use with good infrastructure
  - Public transport with priority
- Congestion-free roads don't result in pollution as low as the models tell us

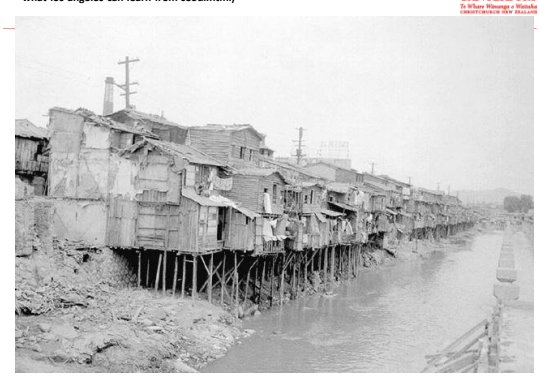
Build it and they will come

- Works with cycling too!
- How much do you need to build?
  - Not much
  - Small amount encourages cyclists
    - Portland (Roger Geller, 2012)
    - Brisbane (Michael Langdon, 2013)
    - Many others

Remove it and they will go?

e.g. Cheonggyecheon, Seoul, Korea

Before (http://www.kcet.org/socal/departures/landofsunshine/la-river/from-freeways-to-waterways-what-los-angeles-can-learn-from-seoul.html)



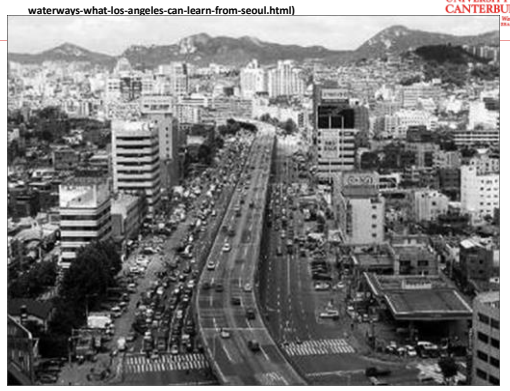
Remove it and they will go?

e.g. Cheonggyecheon, Seoul, Korea

1970: Road built over river

2005: Road removed and river exposed again

Before (http://www.kcet.org/socal/departures/landofsunshine/la-river/from-freeways-to-waterways-what-los-angeles-can-learn-from-seoul.html)



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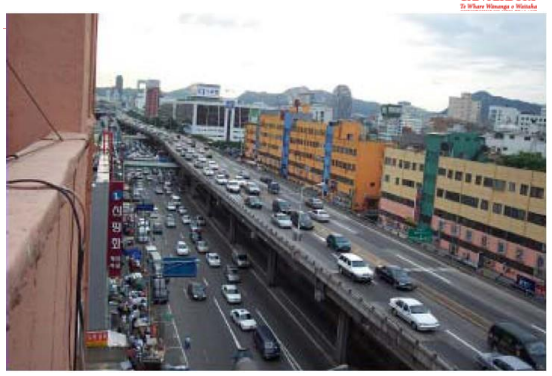
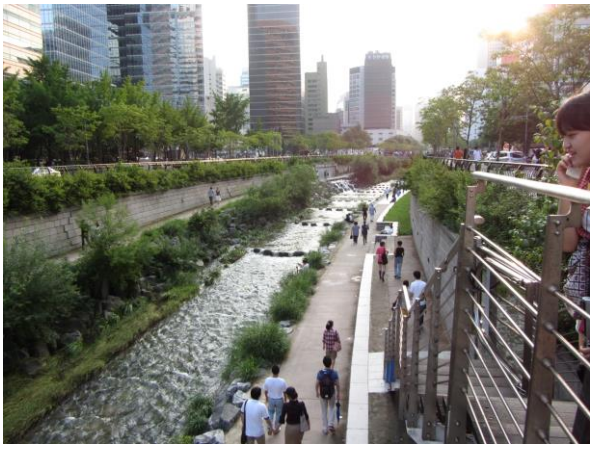




Where did the traffic go?

It just disappeared

- Prof Jeff Kenworthy

PLANS FOR THE FUTURE

Plans

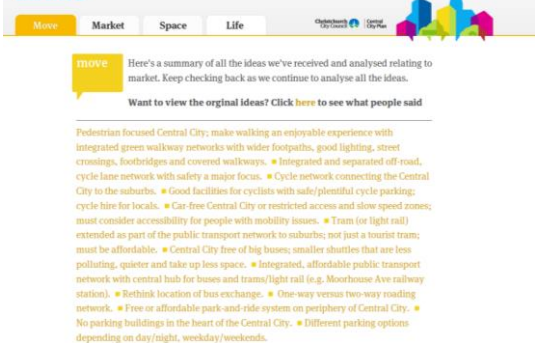
- Share an Idea (CCC), April-June 2011
- Draft Central City Plan (CCC), Aug-Dec 2011
  - Central City Recovery Plan (CCDU), Aug 2012
- Christchurch Transport Strategic Plan 2012-42 (CCC), June 2012
- Christchurch Central Recovery Plan: An Accessible City (CCDU), Oct 2013 *(July 2012)*

"*Share An Idea*" – 106,000 ideas

Through the Share an Idea phase, a number of themes emerged, linking the ideas across the four themes – move, market, space and life. This is what our community asked for:

- A city full of people
- A destination with exciting things to do and places to visit
- Full of green and inviting spaces
- Easy to get to and to walk around
- Low rise with safe, sustainable buildings that look good and function well
- More green in Cathedral Square
- Walkways, cycle lanes and things to do along a redeveloped Avon River/ Otakaro
- A city for all ages and abilities
- A business friendly city
- A community-led plan
- Less cars, less buses, less concrete

Right: The ideas the community shared to create vibrant, prosperous Central City.



Rail

People on public transport

Light rail

A light rail system for Greater Christchurch has been identified as making a significant contribution to the Central City's recovery and economic regeneration.

Many of the world's most vibrant and prosperous cities have created or reintroduced modern, fast and efficient light rail systems in recent years using the latest generation of comfortable and streamlined carriages. A number of those cities are of a similar size to Christchurch, which is now the largest city in Australasia without any form of commuter rail network.

Modern light rail systems, often serving suburbs on traditional heavy rail lines, and then street running on Central City streets, have proven to stimulate urban development and re-development, to offer economic and business growth benefits and to reduce traffic pressures on congested road networks, by offering people a genuine alternative to the private car for their daily travel needs.

These systems have often had a transformational effect on a city's image, helping to generate unprecedented business growth and confidence as a consequence, while improving quality of life, city vitality and community health and wellbeing.

The potential for a rail system to be reintroduced, using modern light rail technology, as part of the Central City's revitalisation and reconstruction, has captured the imagination of many people, while others have suggested that Christchurch is just too small for such a system.

However, international comparisons of long standing and recently introduced light rail systems in cities of all sizes, has shown that such a system would make sense for economic growth, when viewed as part of a comprehensive network of public transport routes and services for Greater Christchurch. A modern, viable system could be economically constructed and efficiently, cost effectively operated.

The potential synergies with the reconstruction and economic revitalisation of Christchurch adds to other more obvious transportation benefits: reduced delays on congested roads and increased public transport patronage as part of a fully integrated multi-modal transport system.

The cost effective and carefully staged reintroduction of a rail network for Christchurch, designed specifically for the city's short, medium and longer term growth needs, is the transformational transportation project for the redeveloped city.

Rail

A Greater Christchurch Light Rail Network

The significant estimated economic stimulus that a rail system might offer Greater Christchurch must be a shared priority of the City Council, Environment Canterbury, CERA, the NZ Transport Agency and, most importantly, central government.

This Plan proposes that a stage one system be introduced between the University of Canterbury and the Central City as part of the redevelopment and as a prelude to high priority Greater Christchurch Urban Development Strategy partnership investigations of a phased delivery of a comprehensive network of passenger light rail routes across the Greater Christchurch sub-region.

Recognising that such a project has significant financial implications and needs to be assessed in the context of a potential system for Greater Christchurch, this Plan proposes that such a project be the subject of further detailed studies and an outline business case to government, perhaps leading in turn to a separate consultative process led by the Greater Christchurch Urban Development Strategy partnership.

Early Studies

As part of the Draft Central City Plan's development, early outline investigations have been undertaken city-wide into the system form and function, constructional and system operational implications, and economic viability of introducing a next generation light rail system at the nucleus of the city's new public transport network.

Appropriate comparisons have been sought with cities around the world of a similar size to Christchurch, including some with broadly shared objectives to stimulate economic growth and regeneration, as well as innovative fully integrated transportation systems to central cities for a host of wider social benefits.

At a broadly estimated system construction cost of around $1.5 to $1.8 billion at today's prices (excluding ongoing operating costs) for a comprehensive city-wide network of five key routes linked to and through the Central City, a decision to initiate this project will be fundamental for the Council and equally importantly for Greater Christchurch.

Such a system would operate in addition to the city's high-quality bus-based public transport systems, providing a comprehensive network of services carrying high levels of patronage on both complementary and feeder routes within the Central City and city-wide

Below: Elevation of a typical commuter rail carriage.

"Electric light rail infrastructure needs to be started."

Cameron, Shirley

The Council is therefore proposing to move forward with the phased delivery of light rail passenger routes and services linking the Central City with the suburbs, using both new lines along the road corridor and upgraded the existing rail infrastructure. To operate seamlessly across the network, the proposal is to commission new light rail vehicle rolling stock capable of using combined diesel and overhead electric drive units.

Early routes, starting with a new overhead electrified line from the University of Canterbury to the Central City, would form the nucleus of a long term plan for a Greater Christchurch modern commuter rail network.

Project Stages

An analysis of opportunities to deliver each of the five key routes and sections of routes across the city is shown indicatively on the schematic plan. This highlights that each offers differing benefits for existing and future local businesses and economic growth, land use development and redevelopment and the potential for system patronage growth as associated with increasing the attractiveness of travel by public transport city-wide.

Above: Examples of modern light rail carriages.

Light rail project

When: 2013 to 2015

What: Refer route map

Who: Christchurch City Council, ECan, KiwiRail, Selwyn and Waimakariri District Councils, New Zealand Transport Agency and central government

Cost: $400 million

Control!

- Christchurch City Council (CCC)
  - *Develop a plan for the central city*
  - Share an Idea
- Draft Central City Plan
  - Consultation
- Canterbury Earthquake Recovery Authority (CERA)
  - More consultation
- Minister for Earthquake Recovery
- Christchurch Central Development Unit (CCDU)
  - Christchurch Central Recovery Plan

But…

- Transport out of the Christchurch Central Recovery Plan
- Transport Chapter (Accessible City) written and consulted on
  - Includes 30km centre
  - signed off by Minister Dec 2013

What about the suburbs?

- Intentionally not in Christchurch Central Recovery Plan
- Crucial in linking centre to where people live
- Plus ongoing CCC local suburban plans

Who is going to pay for it?

"The projects in the Recovery Plan are based on those in CCC's own draft Central City Plan, so the Government expects CCC to make a substantial financial commitment to these projects, especially in the case of civic assets like the Convention Centre and the Metro Sports Facility" - ccdu.govt.nz/faq/delivery-of-the-anchor-projects

"is akin to your parents choosing the house you buy, but expecting you to fund the mortgage"

Government Policy Statement for Land Transport Funding (GPS 2012/13-21/22) little except roads - Christchurch Transport Plan states "*this means the funding available for public transport, cycling and walking networks as outlined in this Plan will be heavily constrained for much of the early recovery period*".

Land Use Recovery Plan (LURP)

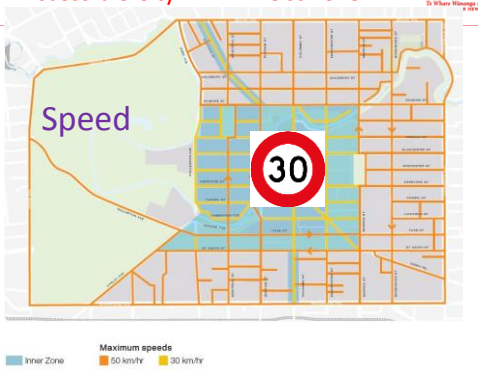
- Ministerial direction under the CER Act
- Has statutory effect
- Identifies & prioritises greater Christchurch urban development for 10-15 years
- Excludes CBD & residential red zones
- Partnership led by ECan (CCC, TRONT, SDC, WDC, NZTA)
- Active involvement of CERA
- Contains priorities for
  - Principal land use responses
  - Housing
  - Business

Christchurch Transport Strategic Plan 2012-42

Christchurch Transport Strategic Plan 2012-42

Christchurch Central Recovery Plan: An Accessible City - Oct 2013

Christchurch Central Recovery Plan: An Accessible City - Oct 2013



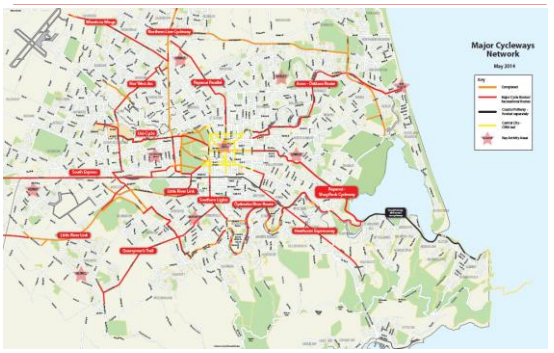
Other transport in the Plans?

- Transport policy could be more sustainable
  - No reference to rail
  - Still a lot of parking
  - Some one way streets remain
  - Still largely car-based
  - No details for the suburbs

A CYCLING CITY

We're Not Starting from Zero…

Major Cycleways



Major cycleways

- $70m signed off as 5 yr plan June 2013
- Names given March 2014
- Started planning
- Budget blowout to $150m!

Open Streets

- September 2013

Ilam Rd

- Finished mid 2013

Big vs small

- Big projects
  - Slow central city speeds
  - Cycle route network
- Transition Initiatives
  - Recycle a Dunger
  - ICE cycles
  - Christchurch Otautahi Cargo Bike Annual Rally (CHOCBAR)

Christchurch
- Copenhagen of the South?

For
- Plenty of road space
- Flat terrain
- Mild and dry climate
- Many short journeys
- People like cycling
- Massive infrastructure build

Against
- Perceived as dangerous
- Limited investment
- No central govt interest?
- Low population density?
- Our love of cars?
- Little congestion & high speeds

A RAIL CITY

Rail

- It is too expensive!
  - Or is it?

Rail

- Costings are always high as no precedent
- In Perth, the Rail costs the same as one lane of motorway
- Potential for *Value Capture/Uplift*

Final Conclusions

- Investing in cycling is very cost effective especially health benefits
  - Cater for the needs of '*potential*' cyclists
- Investing in rail is better value than we are led to believe + value Capture!
- Huge opportunity NOW
  - Some promising signs & Plans
  - National Cycleways are happening
  - But a bit too much car-centric BAU
  - Rail should be reconsidered